

PART V.

CLASSIFICATION; FIGURE OF MERIT; INSIGNIA AND TELESCOPIC SIGHT; INSPECTORS OF SMALL-ARMS PRACTICE; RECORDS AND REPORTS.

CHAPTER I.

CLASSIFICATION.

214. CONDITIONS AND REQUIREMENTS.—The conditions and requirements for qualification in the several grades of marksmanship are set forth in the following table and regulations:

Grades.	Estimating distance.	Rifle firing.					
	Average degree of accuracy required in 5 consecutive estimates of distances.	Total number of points and per cent of possible score required in record practice of each course for qualification.					
		Marksman's course.		Sharpshooter's course.		Expert rifleman's test.	
		Points.	Per cent.	Points.	Per cent.	Points.	Per cent.
Third-class man *							
Second-class man	75 per cent	200	40				
First-class man	80 per cent	250	50				
Marksman	85 per cent	300	60				
Sharpshooter	90 per cent			90	60		
Expert rifleman	90 per cent					204	68

*All who fail to qualify as second-class men or better.

215. GENERAL REQUIREMENTS FOR QUALIFICATION.—All who qualify as marksmen take the sharpshooter's course; all who

qualify as sharpshooters take the expert rifleman's course. In estimating distance, failure to qualify in a grade equal to, or higher than, that obtained in rifle firing reduces the final qualifications of the soldier to one grade below that obtained in firing.

216. WHO WILL BE CLASSIFIED.—All who fire will be classified, unless excused from classification by the department commander. Those who fire and fail to complete the course, and are not so excused, will be classified as third-class men.

Men receiving the extra compensation allotted by Army Regulations to expert riflemen will, during the entire time they draw such compensation, be classified as expert riflemen.

All who were absent from the post by proper authority during the entire regular practice season will not be classified.

Soldiers who leave their station so near the beginning or who join so near the close of the regular practice season as to be unable to complete the course, and only such, may be excused from classification by the department commander, but no such men will be excused until the company commander shall have shown in each case that it was impracticable to carry the course to completion. (See paragraph 85.)

The sick, and those excused by the post commander upon the recommendation of the surgeon, will be classified.

217. UNCLASSIFIED.—Men who have been prevented by authorized absence from their stations from following any part of the prescribed course, and those who have been duly excused by the department commander, shall be reported as "unclassified," and the reason and authority therefor shall be quoted in the report.

When an unclassified man is discharged or transferred, his discharge certificate or descriptive list will show his last classification, and also how much practice, if any, he had during the unclassified season, and the per cent made, thus: Marksmanship, second-class man, 1900; unclassified, 1901; concluded slow and rapid fire, record practice, per cent, 79.

218. SPECIAL CLASSIFICATION.—A special classification of "marksmen" will be made for all who properly follow and qualify in special course A.

The requirement for qualification in this grade will be a total average of 75 per cent for record practice in the entire course. (See paragraphs 168 and 231.)

CHAPTER II.

FIGURE OF MERIT.

219. OBJECT.—By the device of the figure of merit a comparison of the standing in marksmanship of different organizations can be instituted and a conclusion drawn as to their probable relative efficiency in battle.

It is composed of the individual figure of merit, dependent upon the accuracy of fire of the individual soldier; the collective figure of merit, showing the effect of the collective fire of the organization; and the general figure of merit, the mean of these two partial figures, which serves as the basis for final judgment.

220. INDIVIDUAL FIGURE OF MERIT.—The individual figure of merit will be computed by multiplying the number of enlisted expert riflemen by 200; sharpshooters by 150; marksmen by 125; first-class men by 75; second-class men by 50; third-class men by 10; those present but not firing by 0, and dividing the sum of the products thus obtained by the total number in the above seven classes. Officers will not be included in the computation of the individual figure of merit.

221. COMPOSITION OF FIRING LINE IN COLLECTIVE FIRE.—As great a proportion of the company as possible should take part in collective fire, but to insure uniformity in comparisons this proportion should be fixed in computing the classification, and should not be exceeded in the actual number of men firing. The firing line in collective fire, therefore, will be composed of not to exceed 85 per cent of all enlisted men of the company enrolled at date of firing.

222. THE COLLECTIVE FIGURE OF MERIT.—The results of the three volleys at each range, expressed in percentage, will be obtained by multiplying the total number of hits by 100 and dividing the product by three times the number expressing 85 per cent, disregarding fractions, of all enlisted men borne on the rolls of the company at the time, regardless of the number firing. In computing the percentage the figures will be carried to two places of decimals, the second decimal figure being increased by 1 if the succeeding figure would be 5 or greater. The average percentage of the company for volley fire at all ranges will be obtained by dividing the sum of the percentages for each range by the number of ranges. The

result of the fire at will will be calculated in the same manner. The collective figure of merit will be computed by dividing the sum of the average percentage of the company at volley fire and that at fire at will by 2.

As an illustration, let us assume a company of 65 men on the date of the collective fire of the company.

Ordinarily the company will complete the collective fire in one day, therefore the strength is assumed the same for the three ranges. Then the computation will be as follows:

Ranges (yards).	Enlisted strength date of firing.	Number actually firing.	Volley fire.					Fire at will.				
			Number of hits at each range.				Percentage computed as per regulations.*	Number of hits at each range.				Percentage computed as per regulations.*
			Lying.	Kneeling.	Standing.	Total.		Lying.	Kneeling.	Standing.	Total.	
600	65	54	20	65	35	120	72.73	18	70	37	125	75.76
800	65	54	19	60	31	110	66.67	25	65	30	120	72.73
1,000	65	54	13	35	27	75	45.45	10	50	30	90	54.55
Aggregate percentage for each class of fire.....							184.85					203.04
Average percentage for each class of fire (dividing above by 3) -----							61.62					67.68
Aggregate percentage for collective fire.....							129.30					
Collective figure of merit (dividing above by 2)-----							64.65					

*Computation of this percentage is as follows:

Volley fire—

For 600 yards, $120 \times 100 = 12,000$; 85 per cent of 65, disregarding the fraction = 55;
 $55 \times 3 = 165$; $12,000 \div 165 = 72.73$.

For 800 yards, $110 \times 100 = 11,000$; 85 per cent of 65, disregarding the fraction = 55;
 $55 \times 3 = 165$; $11,000 \div 165 = 66.67$.

For 1,000 yards, $75 \times 100 = 7,500$; 85 per cent of 65, disregarding the fraction = 55;
 $55 \times 3 = 165$; $7,500 \div 165 = 45.45$.

Fire at will—

For 600 yards, $125 \times 100 = 12,500$; 85 per cent of 65, disregarding the fraction = 55;
 $55 \times 3 = 165$; $12,500 \div 165 = 75.76$.

For 800 yards, $120 \times 100 = 12,000$; 85 per cent of 65, disregarding the fraction = 55;
 $55 \times 3 = 165$; $12,000 \div 165 = 72.73$.

For 1,000 yards, $90 \times 100 = 9,000$; 85 per cent of 65, disregarding the fraction = 55;
 $55 \times 3 = 165$; $9,000 \div 165 = 54.55$.

223. GENERAL FIGURE OF MERIT.—The general figure of merit will be obtained by dividing by 2 the sum of the individual and collective figures of merit.

224. REGIMENTAL INDIVIDUAL FIGURE OF MERIT.—In determining the individual figure of merit of a regiment, the average of the results in its different companies will not be taken; but the total number in each class for the entire regiment will be multiplied by the proper multiplier and the computation similarly continued as in the case of a company.

225. REGIMENTAL COLLECTIVE FIGURE OF MERIT.—In the same way the regimental collective figure of merit will not be determined from the average of company figures, but computed independently, from the total number of shots fired and hits made in the volley fire and fire at will in all the companies.

226. REGIMENTAL GENERAL FIGURE OF MERIT.—The general figure of merit of the regiment will then be the average of these two partial figures.

227. GENERAL FIGURE OF MERIT OF A POST, DEPARTMENT, DIVISION, OR OF THE ARMY.—This will be obtained in a manner similar to that prescribed for a regiment.

The figure of merit of the Army will not include the troops serving in the Philippines, but for those troops a separate figure of merit, computed in general as herein prescribed, may be published from headquarters, Philippines Division.

228. REMARKS.—The commissioned officers of a company will not be included in computing its figure of merit.

Any other officers or enlisted men who, though not required to attend target firing, may yet have practiced, will be included in the individual classification of the organization with which they fire, but will not be considered with such organization in the computation of its figure of merit.

In computing the figure of merit of a department or the departmental determination of the figure of merit of regiments, in cases where troops, during the practice season, change station within the United States from one department to another, the records of such troops only as may be serving in the department for the last month of the practice season will be considered.

For the figure of merit of the Army and the final determination of the figure of merit of regiments, all the companies of a regiment will be considered, even if serving in separate departments.

CHAPTER III.

INSIGNIA AND TELESCOPIC SIGHT.

INSIGNIA.

229. CLASSES.—Upon receipt at department headquarters of the company report of target firing, certain insignia indicating their skill in marksmanship will be issued to each expert rifleman, sharpshooter, and marksman; provided, however, that marksman's insignia will not be issued to those who have at any time qualified as sharpshooters, and sharpshooter's insignia will not be issued to those who have at any time qualified as expert riflemen.

230. MARKSMAN'S PIN.—To marksmen, when first qualifying as such, will be issued a marksman's pin, which will be worn until the close of the succeeding practice season. If qualification is renewed in the succeeding season, the pin may be worn another year, and so on for further seasons, but if the grade of sharpshooter is attained, or that of marksman not reached, the pin will not be worn.

231. MARKSMAN'S PIN; SPECIAL COURSE A.—To marksmen, when first qualifying as such in special course A, will be issued a marksman's pin different in design from that for the regular course. If qualification is renewed in the succeeding season, the pin may be worn another year, and so on for further seasons, but if the grade of marksman is not reached the pin will not be worn.

This pin will be issued upon the certificate of the company commander that the soldier has qualified under the regulations as a marksman in special course A.

To the soldier who has qualified as a marksman in special course A for three years, not necessarily consecutive years, or, in the case of enlisted men, not necessarily in the same enlistment, a pin will be issued which will specify the years of qualification, and this pin will be worn above the marksman's pin so long as the soldier is entitled to wear the latter.

232. SHARPSHOOTER'S BADGE.—To the sharpshooter, a silver badge will be issued. For the year when qualification is first completed, the badge will consist of a pin and cross; the soldier having once qualified as a sharpshooter may continue to wear the badge even if qualification is not renewed in future

years. To the soldier who has qualified as a sharpshooter for three years, not necessarily in the same enlistment, a silver bar will be issued, which will specify the years of qualification and will be attached to the badge between the pin and the cross. For each additional three years of qualification an additional bar will be issued, and each in succession attached below the one previously supplied and above the cross.

If the grade of expert rifleman is attained, the sharpshooter's badge will not be worn.

233. EXPERT RIFLEMAN'S BADGE.—To the expert rifleman will be issued a silver badge. The soldier having ever qualified as an expert rifleman may continue to wear the badge even if qualification is not renewed in future years. To the soldier who has qualified as an expert rifleman for three years, not necessarily consecutive years, or, in the case of enlisted men, not necessarily in the same enlistment, a silver bar will be issued, which will specify the years of qualification and will be attached to the badge immediately below the pin. For each additional three years of qualification an additional bar will be issued, and each in succession attached immediately below the one previously issued.

234. DUPLICATES.—These various insignia will become the property of the expert rifleman, sharpshooter, or marksman. If they are lost by the owner or in transmission to him, or if they become unsightly from long wear, they may be replaced without cost to the owner. But in all cases the official certificate of the company commander to the effect that he has investigated the circumstances of the loss or damage and finds that no negligence can be imputed to the soldier will be required as evidence upon which to make new issues. Duplicates, if desired for use on separate coats, will be sold to those entitled to wear the different insignia.

235. TELESCOPIC SIGHT.—To encourage efforts, to award efficiency, and to properly equip a special class of shots who shall be not only designated as expert riflemen, but who, in action, shall be employed as such, the telescopic sight is adopted. These sights will be supplied by the Ordnance Department and assigned to enlisted men who have qualified under these regulations as expert riflemen. They will be issued to and accounted for by the company commander, and, in his discretion, may be carried by the men at inspections under arms.

CHAPTER IV.

INSPECTORS OF SMALL-ARMS PRACTICE.

236. NUMBER AND DESIGNATION.—There will be detailed in connection with small-arms practice a number of officers, who will be designated as “inspectors of small-arms practice,” one for each division and each department, at headquarters of the same.

237. DUTIES.—These officers should be selected with reference to their peculiar fitness and qualifications in this line of professional work. It will be the duty of the inspector of small-arms practice of each division and department to examine the regular reports of firings, and from these reports, and from personal inspections, to keep the division and department commanders informed of the absolute and comparative degree of proficiency manifested by the troops of the various units of the respective commands.

CHAPTER V.

RECORDS AND REPORTS.

238. RECORDS.—The “company target record” is the official record of the individual and company fire, record practice, of the company. All entries therein will be made in ink or with indelible pencil. It consists partly of a series of sheets, one for each soldier, ruled for the entry of his record practice and qualifications for each season of his three years’ enlistment.

Another part of the company target record is given to a record of the collective fire and the figure of merit of the company.

These sheets, forming the company target record, will be bound by the loose-leaf plan, so that at any time one or more sheets may be extracted and others inserted. By this means the book will at all times be a live record.

239. REPORTS.—All reports of target firing should be submitted as soon as practicable after the close of firing, the company reports not later than November 5.

The reports are as follows :

1. Reports of Target Firing and Classification. (Annual, company.)
2. Report of Pistol Firing. (Annual, company.)
3. Report of Expert Riflemen. (Annual, company.)
4. Report of Supplementary Target Firing. (Annual, company.)
5. Report of Small-arms Firing. (Annual, department and division.)

These reports will be compiled in accordance with the prescribed forms furnished by the Chief of Ordnance, United States Army.

Commissioned officers will not be included in the annual company, department, or division reports of target firing, but will be reported separately, using for the purpose the form for the company report suitably modified. This report will be submitted by the commanding officers of the organizations with which the officers fire and will be forwarded to the department commander with the regular annual company report.

Coast artillery will render reports of target firing as prescribed by the Chief of Artillery. Field artillery and infantry will render the report of pistol firing so far as such firing is required.

All department reports in the Philippine Islands will be made to the commanding general of the division.

An annual report of small-arms firing by the organized militia of each State will be submitted as soon as practicable after the close of firing on prescribed forms furnished by The Military Secretary, War Department.

PART VI.

TARGETS AND RANGES.

CHAPTER I.

TARGETS.

DESCRIPTION.

240. DIVISION OF TARGETS.—The best method of determining the probable efficiency of a soldier's fire in action, as indicated by the results of his target practice, is to divide the target into various divisions, and to give to hits in these divisions a value constant for all points in any one space, but increasing in value in proportion to the difficulty and desirability of hitting such a space, assuming it to be occupied by an enemy, the highest value being given, of course, to hits in the space occupied by the objective, usually called the "bull's-eye."

241. SLOW-FIRE TARGETS.—The shape and dimensions of the bull's-eye targets adopted for individual slow fire are based upon the above considerations. The objective, or that portion of the target upon which hits have the highest value, is in the case of each target a circle depending in size upon the range. Such targets are A, B, and C. (See "Targets," under "Definitions.")

242. RAPID, SKIRMISH, AND COLLECTIVE FIRE TARGETS.—In these classes of fire the bull's-eye target is not used, but, instead, a figure target. The figures are represented as standing, kneeling, lying, and mounted, respectively, and are used either alone or in groups, depending upon the kind of fire employed. Such targets are D, E, F, G, H, K, L, and M. (See "Targets," under "Definitions.")

243. SUPPLY OF TARGETS AND TARGET MATERIAL.—That all may obtain the proper practice, and yet the period of firing

be not unduly prolonged, it is desirable that at least two separate targets with frames of 6 by 6 feet be available for each company; this will require for a one-company post two targets, and for larger posts twice as many targets as there are companies in the garrison. In addition, long-range targets should be supplied in the proportions of at least one for each three companies or fractional part of this unit. As the skeleton target frames for skirmish firing can be used by the companies in succession, no more will usually be required for large posts than for those garrisoned by a single company; all requirements will, therefore, except in very large garrisons, be met by the issue to each post of twenty frames of each of the standing, kneeling, and lying figures. Where this number can not be obtained, temporary wooden rectangular frames, to which cotton cloth can be attached and the proper silhouettes pasted, should be employed.

The cotton cloth for the target frames should be supplied in sufficient quantity to permit each target frame at the post to be re-covered twice a month during the practice season, and the frame of each figure target to be once covered. The paper targets, both for regular practice and skirmish firing, being comparatively inexpensive, should be supplied in sufficient quantity to permit a new one to be used, if so desired, for at least every other practice.

CHAPTER II.

RANGES.

244. RULES FOR SELECTION.—As the nature and extent of the ground available for target practice, and also the general climatic conditions are often widely dissimilar for different military posts, it will not be possible to prescribe any particular rules governing the selection of ranges, but only to express certain general conditions to which ranges should be made to conform as far as may be practicable.

245. RANGES DISTANT FROM POST.—In view of the extreme range and penetration of the .30-caliber bullet, it is probable that in the future it will, in the case of many posts, be found necessary to have target practice conducted at a distance of several miles, or even farther from the post, necessitating the

establishment of a camp on or near the range. The target practice can then be conducted uninterrupted by routine post duties, and fully as good, if not better, results obtained than on a range adjacent to the post.

246. SECURITY NECESSARY.—For posts situated in thickly settled localities, where the extent of the military reservation is limited, the first condition to be fulfilled is that of security for those living or laboring near, or passing by the range; this requirement can be secured by selecting ground where a good natural butt is available, or by making an artificial butt sufficiently extensive to stop wild shots.

For complete security, there should be no road, building, or cultivated ground on either flank of the range, nearer than 300 yards.

247. DIRECTIONS OF RANGE.—The direction of the range with reference to the points of the compass should be determined, as far as practicable, from a consideration of the time most favorable for practice, the direction of the prevailing winds and the direction of the sun.

248. BEST TIME FOR PRACTICE.—It is desirable (if the weather is generally favorable at that hour) to hold the practice in the morning, for then the soldier will not have been fatigued by the day's drill or labor. This latter condition and the position of the sun point to the selection of a ground where the targets can be to the north or west of the firing point; the soldier will then have the sun behind his back or at one side, and never in his eyes; and the light on the targets will be uniform and not broken by the shadow of the markers' shelters.

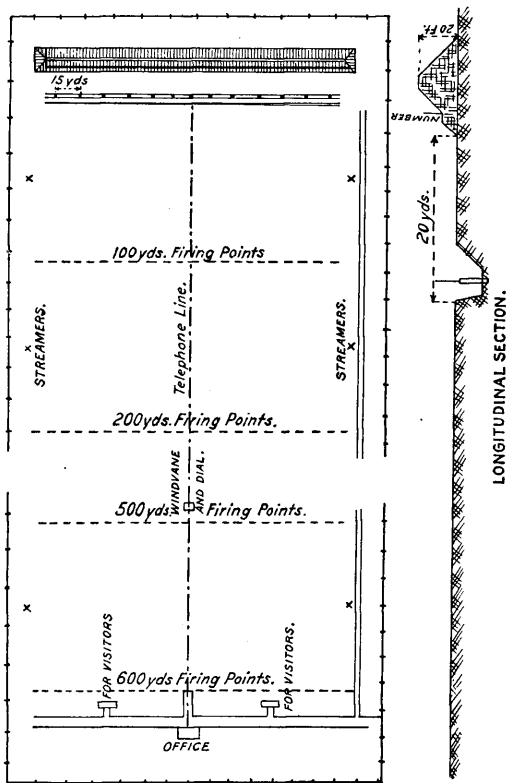
249. BEST GROUND FOR RANGE.—Smooth, level ground, or ground with only a very moderate slope, is best adapted for a range. If possible, the targets should be on the natural surface of the ground on the same level with the firer, or only slightly above him. Firing down hill should, if practicable, be avoided.

250. EXTENT OF RANGE.—Final and important conditions require that the distance from the soldiers' barrack or camp to the range should not be excessive, and that the range should be sufficiently extensive to permit firing up to at least 1,000 yards.

251. INTERVAL BETWEEN TARGETS.—That the firing may, if desired, be brought under the direct supervision of a single

officer, and to reduce to a minimum the amount of labor required in preparing the butt and ground, the targets should only be placed far enough apart to obviate the danger of a shot being fired on the wrong target. Fifteen yards between centers of targets will be found a good distance to fulfill this condition. (See Plate IX.)

PLATE IX.



252. CONTINUOUS SHELTERS.—For targets which revolve on a horizontal axis or slide vertically, if placed with this interval, the markers' shelter should be continuous, extending also in front of the space between the targets; this will afford all the markers complete shelter, and will permit those at any target to be relieved or communicated with without compelling a cessation of any firing.

253. SEPARATE SHELTERS.—When targets sliding or revolving horizontally are employed, or where it is not practicable to make the markers' shelter continuous, the targets should be arranged in pairs, with intervals of 6 to 10 yards between the targets, and about 50 yards between the pairs. Or, if the breadth of the range is not limited, the targets should be arranged singly and about 50 yards apart; each special range will then be entirely independent of those adjacent.

254. ARTIFICIAL BUTTS.—If an artificial butt is constructed, it should be made of earth, be not less than 20 feet in height, (higher if practicable), and should not have a more gradual slope than 45° , this will compel a width, at the base, of about 15 yards. Nearly all the shots will bury in the lower portion of the butt, which from time to time will therefore require repairs. If the front slope is made in steps, the bullets can be dug out and the lead recovered without damaging the crest of the butt (see Plate IX). The butt should extend, at the summit, about 5 yards beyond the outside targets; it should be sodded on top, and sown with grass on the slopes.

255. HILLS AS BUTTS.—For a natural hill to form an effectual butt, it should have a slope of not less than 45° ; if originally more gradual it should be cut into steps, the face of each step having that slope. For a temporary expedient the face of the hill might be plowed perpendicularly to the range, but as the bullets soon cut down the furrows, this measure must be frequently repeated to prevent the danger of ricochets.

256. BULLET STOPS.—At all posts where the range is not provided with a suitable stop butt, a small mound of earth will be erected behind each target of sufficient dimensions to retain most of the bullets that in practice pass through the target.

257. NUMBERING OF TARGETS.—Each target should be designated by a number; these, for ranges up to 600 yards in

length, should not be less than 6 feet in height, and should be painted white on a black ground. The Arabic is preferable to the Roman notation, being more readily comprehended by the soldier; if made of the size suggested, they will always be quickly recognized, even in the haste and excitement of skirmish firing. They should be placed on the butt behind each target, but not so far above them as to prevent the soldier seeing the number when aiming at the target.

258. MEASURING THE RANGE.—The range should be carefully measured and marked with stakes at each 100 yards, in front of each target. The stakes should be about 12 inches above the ground, painted white and lettered in black, with the number of the corresponding target and its distance. These stakes will then designate the firing points for each target at the different distances. Particular care should be taken that each range thus marked out is perpendicular to the face of its own target.

259. FIRING MOUNDS.—If, on account of low ground, it becomes necessary to raise any firing point, a low mound of earth, no higher than is absolutely required, should be made; the mound should be about 8 feet square and carefully smoothed and sodded.

260. RANGES PARALLEL.—The different ranges for the same distance should all be parallel, so that similar conditions with respect to wind and light may exist.

It is not essential, however, that the ranges employed for long-distance shooting should be parallel to those used for the ordinary company practice at distances of 600 yards or less.

261. STREAMERS.—For ranges used for only a few companies, a pole extending about 20 feet above ground should be erected at one side of the range, near the targets, one near the 300 yards and one near the 600 yards firing points, from which streamers should be flown to indicate the direction and, approximately, the strength of the wind.

For large military posts, where considerable firing is held and the range, therefore, of increased breadth, a second line of poles and streamers should also be placed on the opposite flank of the range; these will be required, as otherwise the soldier can not, at the angle at which he sees the flags, correctly estimate the direction of the wind with reference to the range. At ranges where the topography of the surrounding

ground causes local eddies or currents, the poles and streamers should be placed every hundred yards, or at any other points where they may be particularly required. A wind vane and clock face by which the direction of the wind with reference to the axis of the range can be expressed will also be found of considerable utility.

A pole and streamer should also be placed at the center and top of the butt; this streamer, and those at the side of the range, will then also serve as danger signals, to warn the surrounding inhabitants that firing is in progress.

262. PIT SHED.—A small house or shed should be built in the target pit, in which the marking disks and signal flags and spare parts of the target frames for making immediate repairs should be stored. It should be sufficiently large to afford a shelter for the markers in case of a sudden storm.

263. DANGER SIGNALS.—A socket for the staff of the danger signals should be placed on the markers' shelter in front of each target, and so inclined that the flag will always fall clear of the staff and be readily seen.

264. RANGE HOUSES.—On large ranges where competitive firing is held, a house containing a storeroom and several office rooms should be erected in some central place, off the range, but in its immediate vicinity. Such facilities as will enable visitors to satisfactorily witness the firing should also be provided.

265. TELEPHONE SERVICE.—When practicable, ranges should be equipped with a telephone system, connecting the target pit with each firing point, the range house, and the post.

PART VII.

COMPETITIONS.

266. The competition was instituted and exists for the purpose of fostering interest in target practice, of furnishing the means for the exchange of ideas among those who excel in small-arms firing, and for classifying the best shots according to merit shown under similar conditions. There will be four competitions yearly, as follows:

1. The Division Rifle Competition;
 2. The Army Rifle Competition;
 3. The Division Pistol Competition;
 4. The Army Pistol Competition.
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CHAPTER I.

DIVISION RIFLE COMPETITION; ARMY RIFLE COMPETITION; DIVISION PISTOL COMPETITION; ARMY PISTOL COMPETITION.

THE DIVISION RIFLE COMPETITION.

267. SELECTION OF COMPETITORS.—(a) *Enlisted Men.*—The commanding officer of each company of infantry and engineers and each troop of cavalry will annually select from the enlisted men of his company or troop the most suitable soldier, due regard being paid not only to the excellence of shooting, but to steadiness and good soldierly habits and conduct, and report the name of the man thus chosen to the post commander, who will send him to the place of competition on the date fixed by the division commander. If so desired, one competitor may also be selected in a similar manner from either the regimental noncommissioned staff or band,

but not from both. The post noncommissioned staff may be, but is not required to be, represented, the maximum being one from each department. Enlisted men of the coast artillery will be permitted, but will not be required, to compete, and will be selected by company commanders as in the case of infantry organizations. The selection will be reported through proper military channels to the division commander, who will take such action as the exigencies of the service demand.

(b) *Officers.*—Each post commander will report to department headquarters the names of any commissioned officers, except medical officers, among the expert shots in his command who may desire to enter the competition and whom he can recommend for that purpose; further stating, whenever more than one officer is recommended, the comparative proficiency as rifle shots of those reported. From these reports, or from such additional reports of scores actually made as the department commander may require, the division commander will select two officers as competitors from each regiment of infantry or cavalry and one from each battalion of engineers in his command, and in addition such officers from the general staff and the different staff departments as he deems proper. In case a regiment is divided between two or more divisions, the final selection of officers therefrom will be with the War Department. The coast artillery may be represented at the discretion of the division commander, such representation to be based on the ratio of one officer to six companies.

268. ASSEMBLY.—The officers and enlisted men thus selected will be assembled at some convenient place early in August of each year, and after the completion of the preliminary practice the enlisted men will compete for places on the division team. The officers will also compete at the same time with each other, not for places on the team, but for medals. In this competition the firing will be slow fire, rapid fire, and skirmish fire, and the composition of the team determined by the aggregate of the scores for all of those classes of firing.

269. PRELIMINARY PRACTICE.—The preliminary practice will consist for each competitor of the record practice, marksman's course, except skirmish fire, as prescribed in these regulations and subject to regulations governing competitions.

There will be one run, skirmish fire, which will be conducted as prescribed in the marksman's course (paragraph

141), except as that paragraph conflicts with the following particulars: Forty rounds of ammunition per man are issued, and the commands for firing will be those prescribed in the Infantry Drill Regulations for "fire at will" (paragraph 141, Infantry Drill Regulations, 1904), instead of for "fire with counted cartridges." Each skirmisher fires at least five rounds at each halt, provided he has that number of cartridges remaining, and such number in excess of five as he desires and the time limit permits. A defective cartridge counts as one shot and will not be replaced. When more than forty hits are found in a group target the score will not be counted and the competitor will make another run. Pieces will be loaded only from the clip, a full clip being always used. For convenience in loading, the competitor, upon halting, may remove one or more clips from the belt if he desires.

The order of sequence of the various classes of fire (slow, rapid, and skirmish fire) will be determined by the officer in charge of the competition, the controlling feature of whatever programme adopted being to secure as nearly as possible equal conditions of firing for all the competitors.

270. COMPETITION PROPER.—The classes of fire in the competition proper will be the same as prescribed in the preliminary practice, except in the number of scores and skirmish runs, which will be doubled, and all subject to regulations governing competitions.

The order of sequence of the various classes of fire (slow, rapid, and skirmish fire) will be determined by the officer in charge of the competition, the controlling feature of whatever programme adopted being to secure as nearly as possible equal conditions of firing for all the competitors.

271. DIVISION TEAM.—The strength of the division team will be in direct proportion to the number of enlisted competitors engaged in the respective division competitions, the ratio being fixed at one member of the team to five competitors, fractions not considered. Thus, from 75 competitors will be constituted a division team of 15 members; from 100, 101, 102, 103, or 104 competitors a team of 20 members; from 105 competitors a team of 21 members, and so on. The personnel of the team will be composed of those enlisted competitors making the highest aggregate scores for the entire competition proper.

272. PRIZES.—To the members of the division teams thus selected the following gold, silver, and bronze prize medals will be awarded, according to order of merit, and in the ratios indicated in the following table:

Number composing team.	Gold medals.	Silver medals.	Bronze medals.
6 or less.....	1	1	One to each remaining member of the team.
7 to 9, inclusive.....	1	2	
10 to 12, inclusive.....	1	3	
13 to 15, inclusive.....	2	3	
16 to 18, inclusive.....	2	4	
19 to 21, inclusive.....	2	5	
22 to 24, inclusive.....	2	6	
25 to 27, inclusive.....	3	6	
28 to 30, inclusive.....	3	7	
31 to 33, inclusive.....	3	8	
34 to 36, inclusive.....	3	9	
37 to 39, inclusive.....	4	9	
40 to 42, inclusive.....	4	10	
43 to 45, inclusive.....	4	11	
46 to 48, inclusive.....	4	12	
49 to 51, inclusive.....	5	12	

And so on, according to the principle illustrated in the above table.

Any commissioned competitor making a score equal to or greater than that of any enlisted member of the team will receive a medal like that awarded to such member.

The winners of these medals will not part with them without authority from the War Department, but will preserve them, subject to inspection at any time.

The presentation of competition prizes will be made, when practicable, at the conclusion of the contest and will be conducted with the ceremony and formality warranted by the importance of the occasion. Timely requisition should be made for the prizes required.

THE ARMY RIFLE COMPETITION.

273. SELECTION OF COMPETITORS.—Each year there will be assembled, at such time and place as may be designated by the War Department, competitors for the army rifle team.

The competitors will consist of the medal winners at the several division rifle competitions and in addition any distinguished marksmen desiring to compete, whose scores at the last division rifle competitions equaled or exceeded that of the lowest member of the team in the same competitions, respectively. In order to afford opportunity to distinguished marksmen to compete for the army team, each division commander will cause those who desire to compete to attend the division competition, firing thereat in the usual manner during preliminary practice and competition. The scores that they make in the latter firing will be graded among those of all the competitors in order of merit, though they can not win a medal or a place on the division team.

274. PROCEDURE.—The army rifle competition, as regards the preliminary practice, the competitive firing, and the determination of the personnel, twelve in number, of the army rifle team, will be conducted in the manner prescribed for the division rifle competition.

275. PRIZES.—To the members of the army rifle team, in the order determined by this competition, the following prizes will be awarded: First prizes, to the first four members of the team, gold medals; second prizes, to the remaining eight members of the team, silver medals.

The commissioned competitors will be awarded medals in the same manner as at division competitions.

THE DIVISION PISTOL COMPETITION.

276. DESCRIPTION.—Each year representatives of the service using the pistol, apportioned as below, will be assembled for division competitions with that arm. These competitions will be held at such places and times as may be designated in orders from division headquarters.

The places will be selected preferably from those at which are held division rifle competitions, and the dates will, if practicable, immediately precede or follow the dates for the competitions.

277. SELECTION OF COMPETITORS.—(a) *Enlisted men.*—The commanding officer of each troop of cavalry and each battery of field artillery, will annually select from the enlisted men of his organization the most suitable soldier, due regard being

paid not only to the excellence of shooting with the pistol, but to steadiness and good soldiery habits and conduct, and report the name of the man thus chosen to the post commander, who will send him to the place of competition on the date fixed in orders from division headquarters. If so desired, one competitor may also be selected in a similar manner from either the regimental noncommissioned staff or band of a cavalry regiment, but not from both.

Enlisted men of infantry, engineers, and coast artillery, armed with the pistol, may be represented as follows, viz:

Infantry.—Two competitors from each regiment, including noncommissioned staff and band; to be selected by the regimental commander.

Engineers.—One competitor from each battalion, dismounted, including noncommissioned staff and band, if any; to be selected by the battalion commander.

Coast Artillery.—In the ratio of one competitor to four companies, including noncommissioned staff and bands; to be selected by the division commander.

The post noncommissioned staff may be, but is not required to be, represented, the maximum being one from each department.

(b) *Officers.*—Each post commander will report to department headquarters the names of any commissioned officers of cavalry and infantry among the expert pistol shots in his command who may desire to enter the competition, and whom he can recommend for that purpose, further stating, whenever more than one officer is recommended from the same regiment, the comparative proficiency as pistol shots of those reported. From these reports, or from such additional reports of scores actually made as the department commander may require, the division commander will select one officer as competitor from each regiment of cavalry and infantry in his command, one from each battalion of engineers, and, in addition, such officers, except medical officers, from the division and department staff as he may deem proper. In case a regiment is divided between two or more divisions the final selection of an officer therefrom will lie with the War Department. The coast artillery may be represented at the discretion of the division commander, such representation to be based on the ratio of one officer to six companies.

Other officers may be selected and reported to the War Department as follows:

By the Chief of Engineers, one officer from among the three battalions of engineers.

By the Chief of Artillery, three officers from the field artillery and ten from the coast artillery.

Besides the above, a total of five officers from the General Staff Corps and staff departments, except the medical department, may be selected by the War Department.

278. ASSEMBLY.—The officers and enlisted men thus selected will be assembled at times and places designated and, after the completion of the preliminary practice, will compete for places on the division teams. The number of members and the personnel composing the division teams will be determined as in the division rifle competitions.

279. PRELIMINARY PRACTICE.—The preliminary practice will consist, for each competitor, of the following practice, dismounted, viz, one score, slow fire, with a time limit of 30 seconds per shot, at each of the ranges 50 and 75 yards; one score, timed fire, with a time limit of 30 seconds per score, 25 and 50 yards, at target A; and one score, rapid fire, with a time limit of 10 seconds per score, at each of the ranges 15 and 25 yards, at the disappearing target K.

280. PROCEDURE.—The procedure in all classes of firing will be as prescribed in dismounted course in these Regulations, and subject to regulations governing competitions.

281. COMPETITION PROPER.—The competition proper will consist, for each competitor, of the same firing prescribed for preliminary practice, except that the number of scores will be, at each range for each class of fire, two instead of one. The order of sequence of the classes of fire (slow, timed, or rapid fire) will be determined by the officer in charge of the competition, the ruling feature of whatever programme adopted being to secure as nearly as possible equal conditions of firing for all competitors.

282. DIVISION TEAM.—The number of members and the personnel composing the division teams will be determined as in the division rifle competitions.

283. PRIZES.—To the members of the division teams thus selected the following gold, silver, and bronze medals will be

awarded according to order of merit and in the ratios indicated in the following table:

Number composing team.	Gold medals.	Silver medals.	Bronze medals.
6 or less.....	1	1	} 1 to each remaining member of the team.
7 to 9, inclusive.....	1	2	
10 to 12, inclusive.....	1	3	
13 to 15, inclusive.....	2	3	
16 to 18, inclusive.....	2	4	
19 to 21, inclusive.....	2	5	
22 to 24, inclusive.....	2	6	
25 to 27, inclusive.....	3	6	

And so on, according to the principle illustrated in above table.

The winners of these medals will not part with them without authority from the War Department, but will preserve them, subject to inspection at any time.

The winner of a gold medal in a division or other authorized competition may, if he so elects, receive in lieu thereof a pistol of special design and superior workmanship, provided with the most improved sights, which will become his personal property, but which will not be used in competitions with men using the service pistol.

THE ARMY PISTOL COMPETITION.

284. SELECTION OF COMPETITORS.—Each year there will be assembled at such time and place as may be designated by the War Department competitors for the army pistol team. The competitors will consist of the members of the several division pistol teams, and in addition any distinguished pistol shots desiring to compete whose scores at the last division pistol competitions equaled or exceeded that of the lowest member of the team in the same competitions, respectively. In order to afford opportunity to distinguished pistol shots to compete for the army team, each division commander will cause those officers and enlisted men of the class of distinguished pistol shots who desire to compete, to attend the division competition, firing thereat, in the usual manner, during preliminary

practice and competition. The scores that they make in the latter firing will be graded among those of all the competitors in order of their merit, though they can not win a medal or a place on the division team.

285. PROCEDURE.—The army pistol competition, as regards the preliminary practice, the competitive firing, and the determination of the personnel, twelve in number, of the army pistol team, will be conducted in the manner prescribed for the division pistol competition.

286. PRIZES.—To the members of the army pistol team in the order determined by this competition, the following prizes will be awarded: First prizes, to the first four members of the team, gold medals; second prizes, to the remaining eight members of the team, silver medals.

CHAPTER II.

OFFICER IN CHARGE AND ASSISTANTS; MARKING, SCORING, AND SIGNALING; ARMS AND AMMUNITION; SHOOTING; TIES; PENALTIES; DISTINGUISHED CLASSES OF MARKSMEN; COMPETITIONS IN THE PHILIPPINE ISLANDS.

OFFICER IN CHARGE AND ASSISTANTS.

287. OFFICER IN CHARGE.—This class of firing will be under the general control of an officer of experience, assisted by such range officers and statistical officers as may be required. The officer in charge will prescribe the hours for any preliminary practice and for matches and competitions. He will also have general control of the range and of its police and government during the firing.

288. RANGE OFFICERS.—The range officers will supervise, in the target pit, the marking and, at the firing point, the scoring of the shots. They will also see that the competitors take, in firing, the prescribed positions, and that the squads at the different firing points preserve order and conform to the regulations of the range. One range officer will generally be required in the target pit to every two targets, and on the range an equal ratio to the firing points.

During skirmish fire a range officer, mounted, should supervise the firing of each two or three of the competitors, and a scorer will follow each competitor to keep record of the shots fired and prevent their being delivered at a wrong target.

289. STATISTICAL OFFICER.—The statistical officer will assign the competitors to targets and to order of firing. They will verify the additions of the scores as reported by the scorekeepers, grade them in order of excellence, and prepare the results for official announcement.

MARKING, SCORING, AND SIGNALING.

290. SIGNALING AND RECORDING HITS.—Hits in the different divisions of the targets, misses, and ricochets, slow, timed, and rapid fire, will be signaled and recorded as prescribed in these Regulations.

291. SIGNALING MISSES.—In slow fire, before any miss is signaled the target must be withdrawn from the firing position and carefully examined by a range officer. Whenever the target is reversed and a miss then signaled it will be presumed that this examination has been thoroughly made, and no challenge of the value signaled will be entertained or re-signaling of the shot allowed.

292. SCORING IN SKIRMISH FIRE.—In skirmish fire, after the run is completed and the signal "Cease firing" has been sounded and repeated twice, the markers will examine the targets, the range officer will record the total hits on each, and the results will be communicated by means of prepared score cards to the statistical officer. In this fire the precautions with regard to the use of a red pencil in marking shot holes will be observed.

293. ACCIDENTAL DISCHARGE.—All shots fired by the soldier after he has taken his place at the firing point, and it is his turn to fire—the target being ready—will be considered in his score, even if his piece is not directed toward the target, or is accidentally discharged.

294. FIRING ON WRONG TARGET.—Shots fired upon the wrong target will be entered upon the score of the man firing as a miss, no matter what the value of the hit upon the wrong target. In timed and rapid fire the soldier at fault is credited with only such hits (if any) as he may have made on his own target; the other soldier repeats his score.

295. TWO SHOTS ON SAME TARGET.—In slow fire, if two shots strike a target at the same time or nearly the same time, both will be signaled; and if a shot was just fired from the firing point assigned to that target, the hit having the higher of the two values signaled will be entered in the soldier's score and no record made of the other hit.

296. STATIONS OF SCOREKEEPERS.—The scorekeepers will be seated close to and in rear of the firing-point stakes, and will, as each shot is signaled, announce the name of the competitor and the value of the shot, and, at the conclusion of the score of each competitor, repeat his name and total score.

297. CHANGING A SCORE.—Competitors must pay attention to the score as announced and recorded, so that any error may be promptly investigated. The recorded value of any shot will not be changed after the following shot has been fired, unless some special message with reference to it is received from one of the range officers in the target pit. Any alteration of a score card must be witnessed by the officer in charge of the firing point and indorsed with his initials.

298. NUMBERING COMPETITORS.—At all meetings where a number of men engage in the same matches or competitive firing the labor of the statistical officers will be greatly lightened and the prompt announcement of the score facilitated by giving to each competitor a number by which he is known throughout the firing.

299. SCORE CARDS.—Each competitor should be given a score card stating his target and order of firing, and containing a blank space for the record of shots fired and for the signature of the scorer. These score cards should be printed on cardboard, using different colors for different ranges; but for all kinds of firing employing the same color for the same distance, as, for instance, all score cards for 200 yards, yellow; for 300 yards, red; for 500 yards, blue; for 600 yards, white, etc. This rule will prevent such a mistake as a competitor firing on a 300-yard score card, with its particular assignment of target, at 200 yards, as the scorekeeper quickly becomes familiar with the color corresponding to each distance.

As scores are completed an officer or noncommissioned officer detailed for that purpose should, without waiting for all the firing to cease, collect the records of the scores and transmit them to the statistical officer, who will enter them in the per-

manent record and their totals upon the bulletin sheets prepared for that purpose.

ARMS AND AMMUNITION.

300. ARM TO BE USED.—In the authorized competitions officers and men will use the rifle or pistol as issued by the Ordnance Department for habitual use in service.

301. ALTERING THE SIGHT.—Except that the sights may be blackened, no alteration of the regular service sights will be permitted. The use of detachable spirit levels, temporary shades for the sight, or orthoptic eyepieces is forbidden.

302. TRIGGER PULL.—The trigger pull must always be at least 3 pounds for the rifle and 4 pounds for the pistol and will be tested (holding the barrel vertically) by each competitor, under the supervision of a range officer, before firing each day and at each range. Competitors will submit their arms for further inspection whenever required.

303. AMMUNITION.—Unless the use of other ammunition is distinctly authorized, the ammunition used will be the service cartridge for the arm as issued by the Ordnance Department.

SHOOTING.

304. GENERAL REGULATIONS.—The rules governing every feature connected with range practice as prescribed in these regulations will, so far as applicable, regulate the procedure in competitions.

305. UNIFORM.—Competitors will wear the service uniform and cartridge belt.

306. SHELTERS FOR FIRER.—Sheds or shelters for the firer will not be permitted at any range.

307. PUNCTUALITY.—Competitors must be present at the firing points punctually at the proper time and in the order stated on their score cards. No application on the part of the competitor for any alteration in his assignment will be entertained.

308. ORDER OF FIRING.—In slow fire the competitors will place themselves at the firing points by twos and will fire alternately, the odd number of each pair being on the right and firing first.

309. LOADING PIECES.—Pieces will not be loaded except by command or until position has been taken at the firing stand. In loading the pistol only five cartridges will be inserted in the cylinder at one time.

310. POSITION IN PISTOL COMPETITIONS.—At the firing stand, when not firing, the pistol will be held either at raise or lower pistol. While firing, the pistol will be held and supported by one hand only, the arm extended at will, but free from the body and unsupported in any way.

311. WITHDRAWING TARGET PREMATURELY.—In slow fire if, just as a shot is fired, the target is withdrawn from the firing position, the scorer at that firing point will at once report the fact to one of the range officers, who, if upon investigation is satisfied that the case is as represented, will direct that the shot be not considered and that the soldier fire another shot.

312. DELAY OF SCORE.—In slow fire, competitors will not be hurried in their firing, but such slight delay permitted after each shot as they may desire, provided the time of firing the score does not exceed an average of one minute per shot. If an accident to a target, or any other cause over which the soldier has no control, prevents him completing his score within a reasonable interval, he will be permitted such additional time as a range officer may decide.

313. SKIRMISH FIRE.—In skirmish fire forty cartridges will be issued before each run to each competitor, and the latter will not be permitted to have any other cartridges about his person. If any cartridge fails to explode it will not be replaced. If a gun becomes disabled the incomplete score will not be considered, but the competitor will repeat the run.

314. CHANGING ARMS.—No two competitors shall shoot in any competition with the same rifle, nor shall a competitor change his rifle during any competition, unless his first rifle has become unserviceable through an accident, which must be verified by a range officer. The same rule applies to the pistol. Willful and intentional violation of this regulation will warrant the officer in charge, in his discretion, excluding the competitor from further competition.

315. CLEANING PIECES.—Pieces can only be cleaned upon the completion of a score. In competitions at more than one distance cleaning will be permitted between distances. While, with these restrictions, cleaning will be permitted, it will not be required.

316. COACHING.—No “coaching” or unnecessary communication of any kind with those actually firing will be permitted.

317. WARMING SHOTS.—No warming or fouling shots will be allowed in any competition.

318. ORDER OF FIRE.—The order of fire will be determined by the officer in charge of the competition.

319. SPECTATORS.—During the progress of a match or competition, no one except the officers on duty at the range, the competitors, and scorekeepers will be permitted within the ropes without special permission of the officer in charge.

320. STATIONS OF COMPETITORS AWAITING TURN TO FIRE.—The squads of competitors will be stationed 10 yards in rear of the firing point, where each competitor must remain until called by the scorekeeper to take his position at the firing point and until he has completed his score.

321. EXPRESSIONS OF APPROBATION, ETC.—Expressions on the part of the competitors of approbation or disappointment, with reference to any scores made by themselves or others, must not be uttered loud enough to be heard at the firing point.

322. PROTESTS.—Protests and objections must not be directly submitted to the officer in charge, but to one of the range officers. In case a competitor considers the decision of the latter unwarranted by the facts as presented, he may appeal to the officer in charge. Final appeals from decisions of the officer in charge must be made in writing and forwarded through that officer to the authority ordering the competition.

323. SPECIAL RULES.—Such special rules or directions as the officer in charge may give must be rigidly complied with by competitors and all other persons upon the range grounds.

TIES.

Ties in rifle competitions.

324. IN SLOW AND RAPID FIRE.—In slow and rapid fire ties will be recorded as follows:

(1) By the highest aggregate score made in rapid fire; if still a tie, by the highest total score in rapid fire at 300 yards. If still a tie, the decision will be regulated by the highest

total scores in succession made at 600, 500, 300, and 200 yards, slow fire.

- (2) By the fewest misses in rapid fire.
- (3) By the greatest number of hits on figure in rapid fire.
- (4) By the fewest misses in slow fire.
- (5) By the fewest outers in slow fire.
- (6) By the fewest inners in slow fire.
- (7) If still a tie, by firing single shots at the longest range.

IN SKIRMISH FIRE.—In skirmish fire ties will be decided as follows:

- (1) By the greatest number of penalties imposed.
- (2) By the greatest number of hits.
- (3) By the fewest hits in kneeling figures.
- (4) If still a tie, a special run in skirmish fire.

IN AGGREGATE SCORES.—Ties in the aggregate score will be decided by giving precedence to the competitor having the best total score in the skirmish fire. If the scores in the skirmish fire are also of the same total, the order of merit for that fire (and, therefore, the final order of merit) will be determined as in skirmish fire above.

Ties in pistol competition.

325. IN THE AGGREGATE SCORE.—Upon the completion of a pistol competition, ties found in the aggregate scores of two or more competitors will be decided as follows:

(1) By the highest aggregate score made in rapid fire; if still a tie, by the highest total score made at 25 yards, rapid fire. The tie continuing, it will then be regulated, in succession, by the fewest misses and by the greatest number of hits on the figure, both in rapid fire.

(2) If necessary, the comparison will then extend to timed fire, and will be decided in the following order: (a) By the greatest number of penalties imposed; (b) by the highest total aggregate score; (c) by the highest total score made at 50 yards; (d) by the fewest misses at both ranges together; (e) by the fewest outers at both ranges together; (f) by the fewest inners at both ranges.

(3) The tie still continuing, the comparison will then extend to slow fire, and will be decided in the following order: (a) By the highest total score made at 75 yards; (b) by the fewest misses at both ranges together; (c) by the fewest

outers at both ranges together; (d) by the fewest inners at both ranges together.

(4) If there be still a tie, it will be decided by firing single shots at 75 yards, slow fire.

PENALTIES.

326. EVADING RULES.—Any competitor who shall be detected in an evasion of the conditions prescribed for any competition shall be excluded from further participation in the firing.

Any competitor—

327. FIRING TWICE.—(a) Who shall fire in a name other than his own, or who shall fire twice for the same prize, unless permitted by the conditions of the competition to do so; or

328. FALSIFYING SCORES.—(b) Who shall be guilty of falsifying his score, or being accessory thereto; or

329. OFFERING BRIBE.—(c) Who shall offer a bribe of any kind to a scorer or marker shall, upon the occurrence being proved to the satisfaction of the range officers and the officer in charge, be reported in writing to the officer ordering the competition, who will then direct that the competitor be forever disqualified from taking part in future contests ordered by his authority.

330. INTOXICATION, ETC.—Any competitor refusing to obey the instructions of the officer in charge, or his assistants, or violating any of these regulations, or being guilty of unruly or disorderly conduct, or being intoxicated, will be immediately debarred from further competition at the meeting. The officer in charge will also report the facts in the case to the officer ordering the competition, who will take such further action as he deems proper.

331. INTERFERENCE.—Any person, whether a competitor or not, interfering with any of the firing squads, or annoying them in any way, will be warned to desist, and, if repeated, will be at once ordered off the range grounds.

332. ACQUAINTANCE WITH REGULATIONS.—Competitors and all others connected with the meetings of military riflemen must make themselves acquainted with the foregoing regulations, as well as with the conditions of competitive firing in which they may be participating, as the plea of ignorance of either of them will not be entertained.

DISTINGUISHED CLASSES OF MARKSMEN.

333. REQUIREMENTS.—Whenever a marksman has won three authorized medals in department, division, and army rifle or carbine competitions, or in department, division, and army pistol competitions, he will be announced in orders from the War Department as belonging to a distinguished class, no longer eligible to enter the division competitions with the arm in the use of which he is distinguished.

334. DESIGNATIONS.—If the three medals were won in rifle or carbine competitions, the marksman will be designated a “distinguished marksman,” and if in pistol competition, a “distinguished pistol shot.”

335. BADGES.—To distinguish marksmen and to distinguish pistol shots appropriate badges will be issued which, after being received by the soldier, if lost, can be replaced by purchase only, for which authority must be obtained from the War Department.

COMPETITIONS IN THE PHILIPPINE ISLANDS.

336. Competitions in the Philippine Islands will take place in such numbers, under such regulations, at such places, and at such times as the division commander may direct.

CHAPTER III.

INSTRUCTIONS AND SUGGESTIONS.

337. STATIONERY, ETC.—As soon as the officer in charge is detailed, stationery and office furniture should be obtained from the proper authority. The articles of stationery, such as envelopes, writing paper, typewriting paper, blotting paper, scratch pads, pens and holders, black and red pencils, black and red ink, mucilage, rubber erasers, etc., will ordinarily be obtained from department or division headquarters on requisition; the office and desk furniture, such as chairs, desks, typewriting machine, mimeograph or hectograph, rulers, steel erasers, etc., will ordinarily be obtained from the post quartermaster on memorandum receipt.

338. SELECTION OF ASSISTANTS.—In the selection of assistants too much care can not be exercised. Competitors are apt to be critical of all arrangements and the slightest irregularity furnishes ground for a protest. Close and continued attention to the work in hand on the part of both officers and enlisted men is essential to insure immunity from complaint.

339. STAFF OFFICERS.—Four staff officers are usually sufficient; one chief range officer; one adjutant and statistical officer; one quartermaster, ordnance officer and telephone officer, and, if the competitors encamp, one commissary. A medical officer and hospital corps detachment are also necessary if the encampment is distant from a post.

340. CHIEF RANGE OFFICER.—The chief range officer has charge of the range and pit and all details pertaining thereto. During the firing his place is on the firing line. During skirmish fire he personally commands the firing line.

341. RANGE OFFICERS.—Under the direction of, and as assistants to, the chief range officer are a number of range officers, not fewer than one to two targets in the pit, and one to two firing points on the range, or to two skirmishers in skirmish fire.

342. ADJUTANT AND STATISTICAL OFFICER.—To the adjutant may properly be assigned the direct charge of the competitors, whether they are encamped or assigned to companies in barracks.

The work of the statistical officer is most exacting. It is understood that, from the nature and importance of his duties, he must be absolutely accurate in his work. As a check, it is well to have two independent calculations of all scores, one by the officer and one by the clerk.

343. QUARTERMASTER, ETC.—This officer has charge of the supply of ammunition, sandglasses or timers, benches, tables, tents for shelter, boundary rope, trigger weights, and office furniture, and the preparation and care of the range house and range.

344. DETAILS OF ENLISTED MEN.—The details of enlisted men for their several duties should be permanent for the competition; the men in the pit should remain in the pit and the scorers on the range should remain on the range. In skirmish firing, a noncommissioned officer should follow each competitor and should be instructed to kneel and sight over the shoulder of the firer to see that he fires on the proper

target. These noncommissioned officers should be changed from one competitor to another for each run.

345. ASSIGNMENT TO TARGETS.—Instead of assigning competitors to targets by lot, it is believed fairer to assign them by a scheme worked out prior to the competition; this scheme so planned as to minimize the chances of collusion.

346. MOUNTS FOR RANGE OFFICERS.—The mounts assigned to range officers in skirmish firing should be perfectly broken to fire, thus permitting the undivided attention of the riders to the firing.

347. COMPOSITION OF SQUADS IN SKIRMISH FIRE.—Care should be exercised that the number of skirmishers composing a squad should never be greater than can be conveniently handled.

348. ARRANGEMENT OF RANGE IN SKIRMISH FIRE.—When the limitations of the range require the groups of targets to be so close as to cause possible confusion, assistance to the skirmishers in "catching" their targets will be given by staking the range at the halting points by small white posts, aligned accurately one behind the other, each row of posts extending in a direction perpendicular to the line of targets and placed on a line midway between groups. The skirmisher then makes his run between two lines of stakes, which direct his eye to the proper target, but which lend no assistance otherwise.

CHAPTER IV.

POST COMPETITIONS.

349. OBJECT.—To further the interest in target practice, post contests in small-arms firing are instituted, and if practicable will be held monthly throughout the year. When practicable these post competitions should take place on the same day as the monthly field or athletic exercises, or the following day.

The monthly report of drills and exercises will contain reference to these competitions. Post commanders will do all in their power to contribute to the success of these contests on these occasions, awarding to victorious teams extra privileges

and encouraging the interest in the contests by their presence when practicable.

The programme at these post competitions is left to the discretion of commanding officers. A series of courses is herewith suggested as being sufficiently brief to maintain the interest and sufficiently varied to meet the conditions at all posts.

The firing in these competitions will, as a rule, be team firing; teams usually will be composed of a total of five officers and enlisted men as principals and two alternates, to be selected by each organization commander from his company, troop, or battery.

It is recommended that, when practicable, competitions be held also between battalions, squadrons, and regiments.

In case the conditions are unfavorable for mid-range or long-range practice, or for skirmish fire, the contests may be confined to short-range, slow, timed, and rapid fire. If no outdoor firing can be held, they will be held indoors at targets Y and Z with gallery or service ammunition.

350. RULES.—The rules governing the annual division and army competitions will, so far as applicable, regulate the procedure in post competitions.

Officers' contests will be arranged by post commanders; but care will be taken that not too large a proportion of the ammunition available for competitions is expended by officers.

Contests will be decided quickly, that the interest of the spectators may not flag. In some cases it may be well to adopt the methods of fire at will, each team firing on a separate target, all the members of the team firing at the same time with a time limit, marking to be postponed until the end of the firing.

Firing will not be confined to the best shots. Contests between teams of inferior shots, no member of which has in the last regular practice made more than a certain score at certain ranges, should be encouraged.

Individual contests will also be encouraged.

351. PROPOSED PROGRAMMES FOR POST COMPETITIONS.

WHEN A COMPLETE RANGE IS AVAILABLE.

(1)

Slow fire.

1 score at 200 yards.
 1 score at 300 yards.
 1 score at 500 yards.

Rapid fire.

1 score at 200 yards.
 1 score at 300 yards.
 1 score at 500 yards.

(2)

Slow fire.

1 score at 500 yards.
 1 score at 600 yards.

Skirmish fire.

1 run.

(3)

Slow fire.

1 score at 800 yards.
 1 score at 1,000 yards.

Rapid fire.

1 score at 500 yards.

(4)

Slow fire.

1 score at 200 yards.
 1 score at 300 yards.
 1 score at 600 yards.

Timed fire.

1 score at 200 yards.
 1 score at 300 yards.
 1 score at 600 yards.

(5)

Timed fire.

1 score at 200 yards.
 1 score at 300 yards.

Skirmish fire.

1 run.

SHORT-RANGE COMPETITIONS.

(1)

Slow fire.

1 score at 200 yards.
 1 score at 300 yards (sitting
 or kneeling).

Timed fire.

1 score at 200 yards.
 1 score at 300 yards (sitting
 or kneeling).

(2)

*Slow fire.**Timed fire.*

- | | |
|---|---|
| 1 score at 300 yards (sitting or kneeling). | 1 score at 300 yards (sitting or kneeling). |
| 1 score at 300 yards (prone). | 1 score at 300 yards (prone). |

(3)

*Slow fire.**Timed fire.*

- | | |
|---|---|
| 1 score at 200 yards. | 1 score at 200 yards. |
| 1 score at 300 yards (sitting or kneeling). | 1 score at 300 yards (sitting or kneeling). |
| 1 score at 300 yards (prone). | 1 score at 300 yards (prone). |

(4)

Fire at will, 200 yards or any other selected range, exposure thirty seconds. Each team to have its own target. All teams fire simultaneously. Greatest number of hits wins.

INDOOR COMPETITIONS.

(1)

*Slow fire.**Timed fire.*

- | | |
|---------------------------------|---------------------------------|
| 1 score at target X (standing). | 1 score at target X (standing). |
|---------------------------------|---------------------------------|

(2)

*Slow fire.**Timed fire.*

- | | |
|--|--|
| 1 score at target X (sitting or kneeling). | 1 score at target X (sitting or kneeling). |
| 1 score at target Y (prone). | 1 score at target Y (prone). |

(3)

*Slow fire.**Timed fire.*

- | | |
|---|---|
| 2 scores at target X (sitting or kneeling). | 2 scores at target X (sitting or kneeling). |
| 2 scores at target Y (prone). | 2 scores at target Y (prone). |

ADDITIONAL MATCHES.

1. Bull's-eye matches.
2. The two best shots from each company. Ten shots at one range. To be decided by the best score.
3. The two best shots from each company. One skirmish run. To be decided by best run.
4. Disappearing targets, thirty seconds' exposure. Fire at will. Each competitor to have his own target. To be decided by greatest number of hits.

PISTOL CONTESTS.

At posts where there are at least two troops of cavalry or two batteries of field artillery, pistol matches by teams may be substituted for rifle contests, or combined therewith. The following programmes are suggested :

DISMOUNTED COURSE.

(1)

*Timed fire.**Rapid fire.*

1 score at 25 yards.
1 score at 50 yards.

1 score at 15 yards.
1 score at 25 yards.

(2)

*Timed fire.**Rapid fire.*

2 scores at 25 yards.
2 scores at 50 yards.

2 scores at 15 yards.
2 scores at 25 yards.

(3)

*Dismounted course—rapid fire.**Mounted course.*

1 score at 15 yards.
1 score at 25 yards.

1 firing to the right, target H.
1 firing to the left, target H.

MOUNTED COURSE.

(1)

1 firing to the right at target M (5 targets).

1 firing to the left at target M (5 targets).

(2)

2 firings at target M (2 targets).

PART VIII.

FIRE DISCIPLINE.

CHAPTER I.

MOTION OF BULLETS.

352. When a rifle is discharged the bullet is acted upon by several forces, viz, by the projectile force, by the force of gravity, and by the resistance of the air. The effect of these forces is also modified by other minor forces which influence, often irregularly, the flight of the bullet.

THE PROJECTILE FORCE.

353. The explosion of the cartridge gives rise, by the decomposition of the powder, to a large amount of gas, which, being highly elastic, endeavors to occupy a space much greater than that in which the powder was contained, and consequently exerts considerable pressure in every direction.

The pressure upon the sides of the barrel only sets up vibrations in the metal; that in the direction of the breech induces the recoil, which in turn depends upon the projectile force and upon the weights of the rifle and bullet; that in the direction of the muzzle imparts motion to the bullet, which motion, during the passage of the bullet through the barrel, experiences resistance from the sides of the grooves, from friction against the surface of the bore, and from resistance of the air.

354. The projectile force continues to act while the bullet is in the barrel, causing it to move with an ever-increasing velocity until it reaches the muzzle. The velocity with which the bullet finally issues from the barrel is called the *initial* or muzzle velocity, and is measured by the number of feet it would pass over in one second, provided its rate of motion remained unchanged.

355. If, after leaving the muzzle, the bullet were subjected to no other forces, it would continue to move in a straight line, following the direction of the axis of the bore, which is called the *line of fire*, and with, at all points in its path, a velocity the same as the initial velocity; it would consequently pass over equal spaces in equal times.

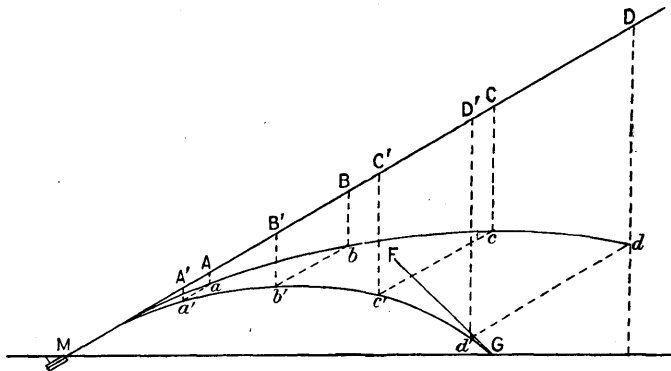
THE FORCE OF GRAVITY.

356. Upon issuing from the muzzle, the bullet, which has previously been supported by the barrel, is influenced by the force of gravity.

357. This force draws all unsupported bodies toward the earth, and if it were not for the resistance of the air, would cause them, whether light or heavy or whatever their shape, to fall from any height in a straight line to its surface with a continually increasing velocity.

Under this influence all bodies would pass over about 16 feet in the first second of fall, about 48 feet in the second, or 64 feet in two seconds; about 80 feet in the third, or 144 feet in three seconds; about 112 feet in the fourth, or 256 feet in four seconds, and so on; the distance passed over in any second being always about 32 feet more than in the preceding second.

PLATE X.



358. The effect of this force is to change the direction of a bullet after it has left the muzzle of the rifle. Let M (Plate X) be the muzzle of the rifle, MD the direction of the line of fire, and suppose that the bullet leaves the rifle with a velocity such that it will, considering only the projectile force, be at A at the end of one second; it will then be at B , C , and D , at the end of two, three, and four seconds, respectively, each of the distances AB , BC , and CD , being equal to MA .

359. Let a bullet be dropped from A ; considering only the force of gravity, it would at the end of one second be at a (Aa being equal to 16 feet), and if bullets were dropped from B , C , and D , they would, at the end of two, three, and four seconds, respectively, be found at b , c , and d ; the distances $Bb=64$ feet, $Cc=144$ feet, and $Dd=256$ feet.

360. The action of the force of gravity upon bodies in motion is the same as upon those at rest, and it will therefore affect the bullet upon leaving the muzzle in the same manner as it does those let fall from the points A , B , C , and D .

Under the combined action of the projectile force and the force of gravity, a bullet will therefore at the end of one, two, three, and four seconds, instead of reaching A , B , C , and D , be found at the points a , b , c , and d , respectively; and if these points and M be joined by a line we will have the path followed by the bullet under the combined action of these forces.

This path is called the *trajectory in vacuo* (the resistance of the air having been neglected) and all points of it are below the line of fire. Its curvature is turned toward the earth and is much more pronounced as the initial velocity of the bullet is less.

361. The effect of the force of gravity, it is seen, is to change the path of the projectile from a straight to a curved line, and by finally bringing it to the earth to limit the distance passed over.

THE RESISTANCE OF THE AIR.

362. The bullet in its passage through the air displaces it in every direction; the resistance offered by the air to this displacement depends upon the shape of the bullet and its rate of motion, and is much greater for those bullets having a high than a low velocity. Its effect is to gradually diminish

the velocity of the bullet, and to cause the spaces over which it passes in equal times to continually grow less and less.

363. This diminution of velocity will cause a ball issuing from a rifle with an initial velocity which would have brought it (neglecting the force of gravity) at the end of one second to the point *A* (Plate X) to only reach some point as *A'*, and instead of reaching *B*, *C*, and *D*, at the end of two, three, and four seconds, to be found at *B'*, *C'*, and *D'*, respectively, *C'D'* being less than *B'C'*, *B'C'* less than *A'B'*, and *A'B'* less than *MA'*.

364. This diminished velocity that the bullet has at any point is called the *remaining velocity*, and is measured by the number of feet that it would pass over from that point in one second, provided it continued to move at the same rate as at the beginning of the second.

COMBINED EFFECT OF THESE FORCES.

365. Under the combined action of these forces it is evident that the bullet at the end of one second, instead of being found on the vertical line through *A* (as when the resistance of the air was neglected) will be found somewhere on the vertical line through *A'*; but since in the case of lead bullets falling for only a few seconds (the velocity of fall being very small) the resistance of the air does not materially alter the effect of the force of gravity, the bullet will be at *a'*, *A'a'* being equal to *Aa*, and at the end of two, three, and four seconds be at *b'*, *c'*, and *d'*, respectively, *B'b'=Bb*, *C'c'=Cc*, and *D'd'=Dd*.

Joining the points *M*, *a'*, *b'*, *c'*, *d'*, we will have the path followed by the bullet under the influence of the projectile force, the force of gravity, and the resistance of the air. This path is called the *trajectory*; it is more curved than the trajectory in vacuo; its latter part more than the first part, and its highest point is farther from the rifle than from the point where it meets the ground.

366. The angle made by the line of fire, or axis of the bore prolonged with the horizontal plane (thus, *DMG*, Plate X), is called the *angle of fire*, and that made by the last element of the trajectory with the ground (thus, *FGM*, Plate X), the *angle of fall*. The angle of fall is always greater than the

angle of fire. The vertical plane passing through the line of fire is called the *plane of fire*.

367. The *range* is the distance from the muzzle of the rifle to the point where the trajectory pierces the horizontal plane through the muzzle. The range increases to its maximum limit as the angle of fire is increased.

The range also depends upon the shape and weight of the bullet (which influences the resistance of the air) and upon the initial velocity.

368. As the preceding paragraphs have shown that no part of the trajectory is a straight line, and that the bullet in its flight continually falls farther below the line of fire (*MD*, Plate X), it is evident that if the line of fire be directed on any object the bullet will not hit it, but will strike below it, and this departure of the bullet from the object will be greater as the distance of the object from the rifle is increased.

To counteract this fall of the bullet, the line of fire must evidently be directed as much above the object as the bullet could strike below it if the line of fire were laid directly upon the object.

369. If the barrel was of uniform thickness and the firer, by looking along its upper surface, was to direct the line of fire at any particular distance above an object, the mark would be lost sight of and inaccuracies would result both as regards elevation and direction.

It is, therefore, essential that the object be kept in view as the direction of the line of fire is altered, and to accomplish this the eye must be so far raised above the breech as to see the object over the muzzle of the rifle.

370. To fix the position of the eye when the line of fire is properly directed for an object at different distances, the rear sight is employed. The straight line passing through the bottom of the notch of the rear sight and the top of the front sight is called the *line of sight*, and the angle which it makes with the line of fire is called the *angle of sight*.

371. The graduations on the rear sight are so determined that when the eye is placed as indicated for any range, and the corresponding line of sight directed upon an object at that distance, the line of fire will pass as far above the object as a bullet, in traversing the distance to the object, would fall below the line of fire.

CHAPTER II.

VARIATIONS IN THE TRAJECTORY.

372. In the preceding discussion the trajectory, throughout its whole extent, has been considered as situated in the plane of sight, and the angle of sight as only affected by the three principal forces which act upon the bullet. In reality, however, there are many other forces affecting the flight of the bullet, which cause changes in the form and position of the trajectory and make necessary modifications of the relative positions of the lines of sight and fire.

373. These influences belong to two general classes, those incident to the rifle and ammunition and those due to the peculiarities of the atmospheric conditions.

THE TRAJECTORY AS AFFECTED BY THE RIFLE AND THE AMMUNITION.

374. THE WANT OF SYMMETRY IN THE BREECH-LOADING PARTS.—The different parts of the breech system which receive and sustain that portion of the projectile force which induces the recoil, not being symmetrically disposed with reference to the line of fire, a slight change is effected in the direction of that portion of the force which propels the bullet, and a deflection of the bullet therefore caused which always takes place in the same direction for all ranges, and is constant for any single range, but increases in amount as the range is increased.

375. With most small arms the deviation is but slight, and as the sighting of the magazine rifle has been determined by experimental firing, its effect has been eliminated.

376. THE RIFLING.—The grooves being inclined to the axis of the barrel, tend by their resistance to retard the passage of the ball, and therefore to diminish its initial velocity and also to give to the bullet a motion of rotation around its longer axis. The initial velocity of this rotation—that is, its velocity at the muzzle of the piece—will depend upon the initial velocity of the bullet and the distance measured in the direction of the axis of the piece required for one complete

turn of the rifling. It will be expressed by the quotient of the former by the latter quantity.

377. The resistance of the air, combined with this rotation of the bullet, causes the axis of the bullet to approach the trajectory, its point to remain in advance throughout its flight, and also produces a lateral motion of the entire projectile. This lateral deviation of the bullet receives the name of *drift*; its direction is determined by that of the rifling.

378. The amount of drift increases as the range is increased, but in a more rapid ratio; for the shorter ranges, where the velocity of the bullet is changing rapidly for each 100 yards increment of the range, this ratio is continually increasing, becoming more fixed in value, as with a longer range the change in velocity for each additional 100 yards becomes more uniform. The projection of the trajectory on the ground will then, for the shorter ranges, be a curve which becomes flatter as the range is increased, but which continually departs from the plane of fire.

379. For the United States small arms the rifling turns toward the right; the drift should, therefore, be in that direction.

380. VARIATIONS IN THE DIMENSIONS OF THE DIFFERENT PARTS.—The manner of their fabrication causes some slight variations in the dimensions of the different parts of small arms, which can be limited in amount, but practically can not be entirely eradicated.

381. The variations which particularly affect the trajectory are those in the dimensions of the bore, the grooves, and the chamber; these mainly affect the initial velocity, and, therefore, the range and height of the trajectory at different points; also variations in the exterior dimensions of the barrel and of the bands, which may cause the latter to bind, to a greater or less extent, at the time of discharge, and variations in the thickness of metal at different points of the barrel; these may cause horizontal as well as vertical deviations of the bullet.

In addition to these variations others are incident to the manner of assembling, to the fit of the barrel in its bed in the stock, and to the different parts of the sights.

382. The deviation of the bullet produced by the combination of these conditions will, for the same rifle, generally take

place in the same direction for all ranges, but to an amount that varies from range to range.

383. As the deviation incident to the arm itself usually varies in extent, and often in direction, for different rifles, a knowledge of the peculiarities of one is no guide to the usual firing of another; for the soldier to make any considerable advance in marksmanship, it is, therefore, not only essential that he should have an intimate acquaintance with the weapon he generally uses, but if he desires his practice to present uniform results, should confine it to that particular arm.

384. VARIATIONS IN THE AMMUNITION.—The manner of their fabrication causes some slight variations in the dimensions of the cartridge case and bullet, and in the weight of the powder charge; these affect the accuracy of fire in different ways.

385. Changes in the exterior diameter of the cartridge shell affect the closeness with which it is supported by the walls of the chamber, and, therefore, alter the amount of force lost in expanding it; this results in diminishing, to a greater or less extent, the velocity of the bullet.

Upon the interior diameter and upon the length of the case depends the amount of compression which the powder receives; this and the degree of crimp to the case around the bullet also affect the initial velocity.

386. Changes in the weight of the bullet, besides influencing the initial velocity, also independently affect the flatness of the trajectory and velocity of the bullet at different points. Changes in the diameter of the bullet cause it to fit more or less tightly the bore of the gun; this influences the velocity and, independently of that, the accuracy of fire. The greater or less uniformity in the bullet's shape and in the disposition of the metal also exerts its influence upon the trajectory.

387. The kind and amount of powder used, the density of loading, and its comparative dryness at that time, all affect the initial velocity.

388. These different influences incident to the ammunition may cause, even with cartridges manufactured with the greatest care and upon the same day, variations, when fired from the same gun, as great as 40 feet in the initial velocity. The average result, as determined by very extensive firing, extending over a long period, is to produce a mean change of about

20 feet in the initial velocity with the modern smokeless powder.

THE TRAJECTORY AS AFFECTED BY THE ATMOSPHERIC CONDITIONS.

389. In treating this subject, it has been endeavored to consider the influences affecting the trajectory in no greater detail than can be easily comprehended by the average soldier, and to suggest only such corrections as can be readily applied to a military rifle, with military sights, and by any enlisted man.

390. The subject can then be best considered under three heads: (1) The effect of moisture and temperature upon initial velocities. (2) The effect of variations in the density of the air. (3) The influence of the wind upon the lateral deflections of the bullet and upon the range.

(1) *The effect of moisture and temperature upon initial velocities.*

391. It has been stated that the comparative dryness of the powder at the time of loading influenced the initial velocity; this dryness is very easily affected, the powder readily absorbing moisture from the air if left exposed to its influence, or being quickly dried by exposure in a warm, dry atmosphere.

392. The amount of moisture in the air affects the initial velocity also by influencing the character of the residuum deposited on the surface of the bore. This presents more or less resistance to the movement of the projectile through the barrel. The greater the absolute amount of moisture present, the softer does the deposit become, and the easier does the projectile pass through the bore. On moist, damp days the bullet will therefore strike high, and a decrease in the elevation will be required; on dry days the reverse effect will obtain.

393. As the temperature of the air increases, the general effect is to increase the absolute amount of moisture, and therefore, for the reasons given above, to increase the initial velocity.

Increase of temperature also increases the initial velocity, in that less of the work of the powder gases is absorbed in heating the barrel, and a greater amount is available for its

effect upon the bullet. This will produce, in cold weather, a considerable variation between the earlier and later rounds, which in warmer weather is not so noticeable.

The greater or less heating of the barrel will also cause appreciable variations in the relation of the caliber of the bore and the diameter of the bullet, which will affect the initial velocity.

(2) *Density of the air.*

394. The resistance of the air to the flight of a projectile varies directly with its density; the density is dependent upon the altitude above the sea and upon the local changes in the barometric pressure, the temperature, and the degree of moisture.

395. For every increase of height above the level of the sea, provided the temperature remains constant, the density of the air diminishes; an increase in the range for any particular adjustment of the sights will therefore result.

396. At any constant altitude above the level of the sea the changes in the height of the barometer will produce effects upon the range which would require consideration if firing special match rifles, but for military practice would involve a refinement not generally practicable.

397. Temperature, however, varying considerably, as it may during a single day's firing, and varying also at different seasons from much below zero to more than 100° above, effects marked changes in the density of the air, and can not be neglected.

As the temperature increases, the density of the air decreases; the resistance which it offers to the flight of the bullet will, therefore, be decreased and the range correspondingly increased. The approximate change in the initial velocity for each change of 10° in the temperature is about 10 feet per second.

(3) *The effect of the wind.*

398. In considering the action of the wind upon the flight of the projectile the rifleman is at once met with a twofold problem. He must determine the probable effect upon elevations and upon deflections or deviations.

399. Assuming that the wind remains uniform in force, variations in its direction produce, at times, marked changes in its relative action upon the projectile, both as to range and as to deflection.

400. To arrive at any satisfactory conclusion, it is necessary to consider the wind force resolved into two component forces, one acting in the plane of fire (i. e., parallel to it), the other at right angles to it. It is then possible to make the required allowances, essentially as if two independent forces were acting, each having a constant uniform direction, but a variable strength.

401. The component of the wind force acting in the plane of fire is termed *accelerating* if the wind is from the rear, and *retarding* if the wind is from the front; it affects the range in the manner indicated by the designation.

402. The component acting at right angles to the plane of fire is called *deviating*, and is to the right or left, as the wind is from the left or right, respectively, of the plane of fire.

403. The direction of the wind is, for convenience, expressed by a clock-face notation, the clock face being supposed to be held in the hand of the firer with the hour XII toward the target or other object of aim and the hour III at the right hand. A wind blowing directly from the front (that is, from the direction of the target) is called a XII o'clock wind, one directly from the left and across the line of fire a IX o'clock wind, and so on.

404. The direction of the wind can be obtained by observing its effects on the smoke, on trees or grass, on flags, or upon the portion of the head or face impinged upon.

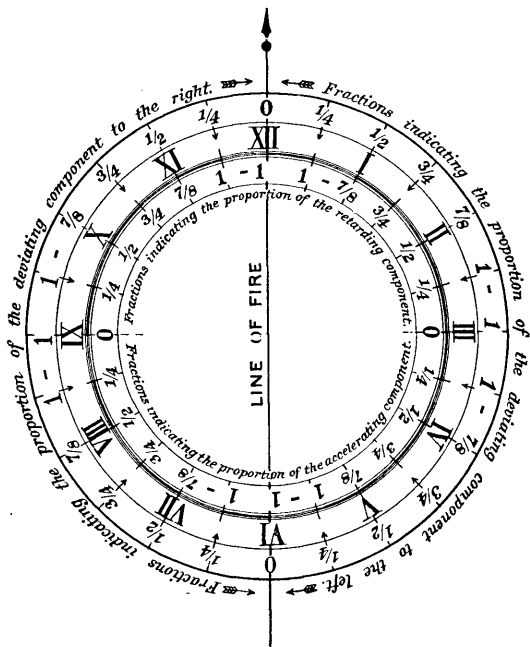
405. The force of the wind is designated in miles per hour, and can be obtained from the readings of an anemometer. It can be judged approximately by observing the manner in which the boughs of trees and flags are affected; also by the sensation produced upon the face and other portions of the body. If the estimates thus formed are frequently corrected by anemometer readings, they will soon gain greatly in accuracy.

406. The following table gives the proportions of the rectangular component forces acting when the wind is from different directions. The force of the wind is assumed as unity, and the components are given in the nearest simple vulgar fraction.

Table.

Direction.	Accelerating.	Retarding.	Deviating to the left.	Deviating to the right.	Direction.	Accelerating.	Retarding.	Deviating to the left.	Deviating to the right.
XII	—	1	0	—	VI	1	—	0	0
XII½	—	1	¼	—	VI½	1	—	—	¼
I	—	⅞	½	—	VII	⅞	—	—	½
I½	—	¾	¾	—	VII½	¾	—	—	¾
II	—	½	⅞	—	VIII	½	—	—	⅞
II½	—	¼	1	—	VIII½	¼	—	—	1
III	0	—	1	—	IX	0	0	—	1
III½	¼	—	1	—	IX½	—	¼	—	1
IV	½	—	⅞	—	X	—	½	—	⅞
IV½	¾	—	¾	—	X½	—	¾	—	¾
V	⅞	—	½	—	XI	—	⅞	—	½
V½	1	—	¼	—	XI½	—	1	—	¼

407. The foregoing table is given in a more convenient form in the following dial:



Dial showing the Approximate Value of the Deviating, Accelerating, and Retarding Components of the Wind with Reference to the Plane of Fire, for every 15°, corresponding to the Half Hours of the Clock Dial.

408. An examination of the foregoing table or dial shows that slight changes of direction, when the wind is near XII or VI o'clock, make considerable changes in the value of the deviating components, while but little change occurs in the values of the retarding or accelerating components. Hence, with the

wind varying between XI and I o'clock, or between V and VII o'clock, the deviating allowance must be carefully observed, while the elevation remains comparatively unchanged. On the other hand, when the wind is between II and IV o'clock, or between VIII and X o'clock, the deviation allowance will be changed but little, while the change in the elevation may be considerable.

409. The lateral deflections produced by the wind have been found to be practically directly proportional to the deviating component of the wind. The amount of deviation produced by 1 mile of wind, acting at right angles to the plane of fire, is called the *coefficient of deviation*.

CHAPTER III.

THE EFFECTS OF FIRE.

VELOCITY AND RANGE.

410. For the shorter ranges the relative loss of velocity is greater for those bullets having originally the greater initial velocity, and is also greater for a light than for a heavy bullet having the same cross section.

411. This decrease in the remaining velocity becomes much less as the range is increased beyond 1,500 yards, and at different distances approaching the maximum range the remaining velocities of the same bullet are sensibly the same, the loss of some of the velocity originally imparted by the projectile force being to a great extent compensated for by that acquired by the bullet in falling through the height due to the increased elevation. At these great ranges the remaining velocity is not affected by slight changes in the powder charge, the variations in the initial velocity being neutralized by the resistance of the air long before the ultimate range is reached.

412. The extreme range is also but slightly influenced by small changes in the powder charge, but very greatly by an alteration in the weight of the bullet; a heavier bullet of the same caliber being better able to overcome the resistance of the air.

The maximum range computed for the U. S. magazine rifle, model of 1903, is 4,781 yards; angle of elevation, 42° , and time of flight, 35.33 seconds.

413. Dependent mainly upon the changes in velocity, three zones of effect are noted in examining the penetration of the small-caliber bullet. The explosive zone, where an effect of that nature, due to the lateral or centrifugal transmission of the shock of impact, is produced, occurs for high velocities, and therefore is confined to the shorter ranges, not exceeding about 300 or 400 yards. Following this latter range, up to about 2,000 or 2,500 yards, the bullet perforates more cleanly, making generally a smooth, clear hole in human bodies as well as in other objects that it completely perforates. At more extreme ranges the effect of the bullet is to produce a contused wound.

414. At very short ranges the bullet is more generally deformed than at a longer range, and consequently in such substances as sand, distant only a few feet, the penetration is very slight, the bullet jacket tearing off or spreading.

TIME OF FLIGHT.

415. For the rifle the bullet is overtaken by the sound of discharge at a distance of about 1,700 yards.

416. In consequence of the variations in the different parts of the small arm and cartridge, bullets fired with a constant aim, from the same gun, on the same day, and under similar meteorological conditions, will strike points of the target more or less widely separated. The degree of concentration of the hits will depend upon the extent of these variations, and will therefore afford a measure of the accuracy of the piece.

417. The central point of a cluster of shots is called the *center of impact*, the horizontal distance of a shot from this point its horizontal deviation, and the vertical distance the vertical deviation. The mean of the horizontal deviations of all the shots will measure the accuracy of the piece in a horizontal direction, and the mean of the vertical deviations its vertical accuracy.

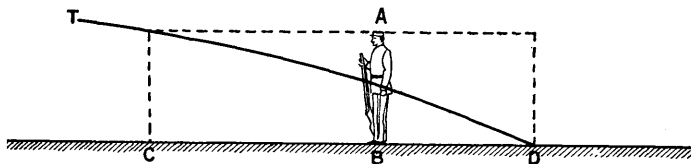
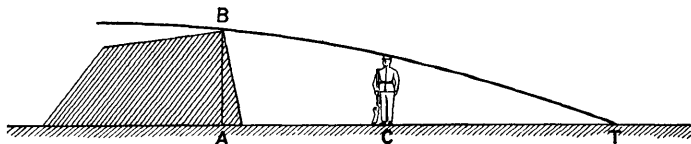
418. The influences affecting the accuracy of the piece, whenever a great number of shots is considered, cause the mean vertical deviation to exceed the mean horizontal deviation.

DANGEROUS SPACE.

419. The trajectory cuts the line of sight in two places, the first near the muzzle, the second at the point aimed at (supposing that point to be struck); between these two points all portions of the trajectory are above the line of sight. The heights of different points of the trajectories, for different ranges, above the corresponding lines of sight are given for the rifle in tables furnished by the Ordnance Department.

420. If an object situated on horizontal ground extends both above and below the point aimed at, there will be a distance in front of it where the trajectory will not be above its

PLATE XI.

Fig. 1.*Fig. 2.*

highest point and some distance beyond it before the trajectory will meet the ground at the level of its lowest point; it is therefore evident that for this trajectory there will be a space in the direction of the plane of fire rendered dangerous for the object. Thus in Plate XI, fig. 1, for an object of the height AB, and a trajectory TD, the dangerous space will be the distance CD, and if occupying any point of this space the object AB would be hit by a bullet following the trajectory TD.

421. The extent of the dangerous space depends upon the height above the ground from which the fire is delivered, upon the flatness of the trajectory, the height of the object and its distance from the origin of fire, and upon the configuration of the ground where it is situated.

422. When other conditions are the same the dangerous space will be greater for fire delivered from a lying than from a standing position. It will be greater when the object is a soldier standing than for one lying down or kneeling and still greater for a mounted man.

423. The dangerous space for the magazine rifle fired against infantry standing and against cavalry at ranges from 100 to 2,000 yards is given in tables furnished by the Ordnance Department. The dangerous spaces are calculated under the supposition that when firing the muzzle of the piece is 56 inches from the ground; that the height of a man kneeling is 3 feet 6 inches and of one standing is 5 feet 8 inches, and that the height of a man mounted is 8 feet; also that aim in all cases is taken at the middle point of the object.

424. When the distance of the highest point of the trajectory from the ground does not exceed the height of the object the entire distance from the muzzle of the piece to the point beyond the object where the shot strikes the ground will constitute the dangerous space.

425.

POINT-BLANK DANGER SPACE.

Position.	Assumed height of line of sight above ground.	Point-blank danger space.	
		Computed.	Found by actual firing.
	<i>Inches.</i>	<i>Yards.</i>	<i>Yards.</i>
Firing standing -----	56	424. 7	427. 6
Firing kneeling -----	30	343. 4	338. 9
Firing lying down -----	12	259. 4	243. 5

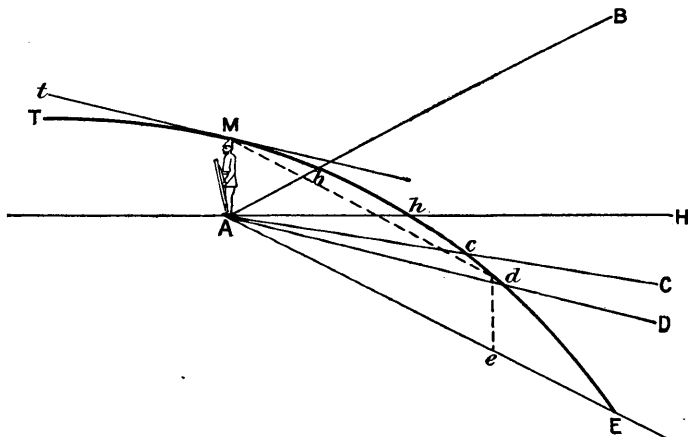
NOTE.—Above computations and firings based upon lowest setting of sight, which corresponds to an angle of departure of 5' 14".

426. If the ground where the object is situated is not horizontal its slope will very materially influence the extent of the

dangerous space. If the object is situated on rising ground the angle of the fall will be increased and the dangerous space, therefore, diminished; but if on falling ground the dangerous space will be increased as the slope of the ground becomes greater, until its inclination exceeds that of the tangent to the trajectory at the point which marks the limit nearest to the firer of the dangerous space for horizontal ground.

427. Thus in Plate XII, for an object of the height AM , and the trajectory TE , to which tM is the tangent at M , the dangerous space on horizontal ground will be Ah , on rising ground Ab , on falling ground Ac , which will reach its maximum Ad , for ground AD parallel to the tangent tM . When the slope increases beyond this limit, as AE , the height of the trajectory between A and e will exceed AM , and the dangerous space will be reduced to the position A , and to the distance eE , the distance Ac not being covered by the trajectory.

PLATE XII.



428. For short ranges, when the trajectory is quite flat and the angle of fall small, the dangerous space is greatly in-

creased by even a slight slope of the ground below the line of sight. As the range is increased this effect is reduced.

DEFILADED SPACE.

429. An obstacle of sufficient thickness to prevent the penetration of the bullet will protect from fire the space extending from its foot to the point where the bullet, which grazes its crests, meets the ground. The extent of the defiladed space will depend upon the conditions similar to those which affect the dangerous space, therefore upon the height of the shelter and upon the curvature of the trajectory, which is in turn determined by the range.

430. In plate XI, fig. 2, the distance AT will represent the defiladed space for the trajectory BT , and an obstacle of the height AB . The soldier beyond T would be struck by the bullets passing a slight distance over the crest B ; he would be partly sheltered between T and C (the dangerous space for this trajectory), and would be completely protected throughout the distance AC .

431. If the height of the shelter is less than that of a man standing, only a partial protection will be afforded, and complete shelter can only be attained by the soldier kneeling or lying down, but even in such cases the efficiency of the fire will be greatly diminished in that the flight of a portion of the bullets will be arrested.

432. If the ground, instead of being horizontal, slopes upward behind the shelter the defiladed space will be diminished; if it slopes downward it will be increased.

CHAPTER IV.

INFLUENCE OF GROUND.

433. The apparent crest of rising ground is the point where the line of sight makes a tangent with the ground, and as the line of sight changes for each position, there may be many apparent crests to the same piece of ground.

Troops defending a slope should always see its foot to prevent there being a dead angle where the enemy may collect.

It may be necessary, for this purpose, to advance the firing line somewhat down the slope, to what is called the military crest as distinguished from the true crest.

Placing troops in this manner, two or more lines of infantry fire from shelter trenches can be obtained, and the artillery brought into action on the crest. In order to hit any one of these, the fire of the attack must be specially directed on it, from the small depth of the dangerous zones on such (rising) ground.

In this case the advanced position of the firing line may be said to arise from the necessity for a clear view of the foot of the slope; but cases may arise where the slope of the ground is such that this disposition is deliberately chosen in order to use two tiers of fire and to utilize the crest to cover reserves and artillery.

The infantry lines being well down the slope, the enemy would have no reason to fire on the crest; hence the reserves of the defense could safely be kept close in rear of this cover, and from their elevated position they can see when and where their action will be most opportune.

While the firing line forces the assailant to deploy and to bring up his reserves in plain sight and under fire, the reserves of the defense can be moved safely and unseen on the plateau, and, if necessary, can be used to fire over the heads of those in front.

The position of resistance can be taken so far in front of the crest that artillery in its rear, on the crest, will be safe from the infantry fire of the attack as long as this position is held.

Enough has been said to indicate the great importance of knowledge of the ground and of its employment, both defensively and offensively. "Knowledge of the ground is no less indispensable to the attack than to the defense—here to profit by strong points, there to avoid them. The ground dictates to the defense the points of resistance and the tactical dispositions; it indicates to the attack the direction in which an assault has no chance of success, and that where it may succeed. Tactical dispositions ought to be based on the properties of the ground; an ideal formation on horizontal ground would be annihilated if it were blindly placed on intersected ground; there is no panacea applicable to all cases."

The Germans enumerate among the qualifications of an officer, "correct appreciation of the ground."

The French regulations say, regarding the occupation—

First. *Ground falling with respect to the enemy's line of sight*: "The most favorable ground for defense is one which presents, in front of the firers, a clear glacis, forming a free field of fire of great extent, inclining gently toward the enemy.

"The greater the fall of the ground in the rear of the crest, the better are troops on this reverse slope sheltered from the fire of the attack. To cover steep slopes with fire, it must be delivered at long ranges, which lessens its efficacy.

"Slight undulations of the ground hide troops from the view of the enemy, but not from his fire coming over the crest.

"The firing line should be sufficiently in advance to overlook the ground, and to leave in its rear a sufficient mask to protect the reserves.

"A position which forces the artillery of the defense to come very close to the firing line, while that of the attack can fire from its normal distance, is defective or badly occupied.

"If the ground in front of the crest has a steep slope, stages of fire can be used if the fire of the upper lines does not endanger the lines farther down the slope.

"Troops in the rear of the crest must not think themselves out of reach of the enemy's fire because they are out of his sight. If there is no shelter, they should take formations with a narrow front. They remain at a distance when the enemy fires at long ranges, and as he advances they approach the crest to avoid the effects of his fire, which falls farther to the rear as the ranges decrease. This forward movement suits the tactical necessities of the fight.

"Observation of the points where the enemy's bullets fall furnishes a useful indication of the positions to be avoided by the reserves, because these points depend on the form of the ground, and not on the will of the firers.

"In choosing a second line of defense, when it is not determined by the nature of the ground and the existence of natural obstacles, the distance to which it will be possible to sweep the slopes in advance of the crest must be considered.

"It is at these distances, measured beforehand, that the shelter trenches or other works of this second line must be constructed. They will so much the better permit of stopping pursuit and reestablishing the fight as the enemy's artillery

comes more within the efficacious zone of infantry fire, which will prevent its coming into action."

Second. *Ground rising with respect to the enemy's line of sight*: "Ground of this nature is favorable to the carrying out of the fight principally by the firing line.

"On such ground, column formations of any kind are eminently vulnerable and line formations with intervals are preferable.

"The distance between the different lines may be less as the inclination of the ground is greater.

"Troops in rear of the firing line will, as a rule, suffer only from fire especially directed on them.

"They ought, therefore, to use every accident of the ground to cover themselves; if there are no shelters, they will find that, in joining the firing line, their best protection is an uninterrupted forward movement, rapidly crossing the diminished dangerous zones. This also enables them, by a single forward movement, to get away from any regulated fire of the enemy.

"Finally, it should be pointed out that such ground has the grave disadvantage of exposing all the defensive dispositions to the enemy's view, who can see all the movements made in the interior of the position."

In point of fact the whole question of the best method of occupying ground is not to be settled in the study on theoretical grounds. Each case must be worked out on the ground to which it is to be applied; and the skill of the commander is shown by the manner in which his dispositions are adapted to the ground.

CHAPTER V.

DEDUCTIONS.

EMPLOYMENT OF FIRE IN ACTION.

434. LIMIT OF INDIVIDUAL FIRE.—The different kinds of fire most appropriate for the various stages of an action depend upon the size of the object, especially as compared with the height of the shot group and upon the greater or less certainty of its distance; the degree of the soldier's proficiency

with his weapon; the moral condition of the troops; the amount of ammunition; and finally upon the accuracy of fire of the rifle, and the flatness of the trajectory at different ranges.

The distances beyond which the fire upon different objects will produce but a slight effect can be only approximately stated; the ability of the men, the state of the weather, the stage of the action, may all cause considerable modifications.

As a general rule, however, the fire of the average individual soldier will not prove effective without the expenditure of considerable ammunition, when directed upon a single man, lying down, at a greater distance than 500 yards; upon a man kneeling, beyond 600 yards; upon one standing, beyond 700 yards; upon a mounted man, beyond 800 yards; or upon a squad, lying down, beyond 1,000 yards. At the latter distance the fire would usually be effective against a line of skirmishers (5-yard intervals), and up to 1,200 yards against a line of skirmishers with intervals reduced to 1 yard. Fire upon a body of men, in closed ranks, of the width of a company front (12 to 15 yards), will generally be effective up to 1,000 or 1,200 yards; upon a body of men with a front of 20 or 25 yards, or upon a section of artillery up to 1,200 or 1,300 yards; upon columns of companies, or small, compact bodies of artillery or cavalry up to 1,500 or 1,800 yards. Beyond these distances aimed fire will not usually be effective, and should not be attempted except upon large bodies of troops. If the supply of ammunition will permit the expenditure of a great number of cartridges, unaimed or, more properly, curved fire may be conducted up to the extreme limit of rifle range by troops in position acting on the defensive. In the case of troops forming for an assault or advancing to the attack of other troops under cover, the employment of such fire is decidedly disadvantageous.

When the enemy is at only a moderate distance (600 or 800 yards), the flatness of the trajectory and, if the ground is favorable, the added effect of the ricochet render the slight errors which may be made in the estimation of the range of but little importance. When he approaches within the continuous dangerous space of the rifle, no further changes in the adjustment of the sight should be made as his distance varies.

For longer ranges, not exceeding those where an estimation of the distances can be depended upon to within 100 yards, the

depth (100 yards) of the ground well covered by the fire of a body of men will still render the fire effective even if the correct range is not assumed. That the effect of the ricochet may not be lost, care should be taken not to overestimate the distance, and to aim at the feet of the enemy. This selection of a point of aim is especially advantageous, as, when it is employed, a greater number of the bullets in the shot group will usually prove effective, and also the error so common in the heat of action of taking too full a sight is neutralized.

For ranges of 1,000 to 1,200 yards, when the distance is a matter of some uncertainty, and especially when the enemy is in motion, the simultaneous employment by different bodies of men of two or more elevations possesses some advantage. If two different sights are chosen, they should differ by 100 yards, one 50 yards greater, the other 50 yards less than the estimated distance; at still greater distances three elevations may be selected; one should be that of the estimated range, one 100 yards greater, the other 100 yards less.

The fire will, of course, be less concentrated, but a much greater extent of ground will be covered. The employment of different elevations by small bodies of men should never be permitted.

435. VOLLEY FIRE.—For troops behind shelter acting on the defensive, the employment of volley firing possesses many advantages. It enables the officers to govern the direction of the fire and control its extent and the expenditure of ammunition. It readily permits the officer to regulate the adjustments of the rifle sight and to require all to adopt the one deemed most appropriate; and, finally, it affords the officer the best means of retaining a full control over his men, an element of great importance, especially in the case of undisciplined troops. As the enemy approaches toward the distance from which his final rush may be expected, or even before that period, if into ground affording little or no shelter, the volley fire of the defensive should be replaced by independent fire, conducted at first slowly and deliberately, and finally pushed to its utmost limit.

Volley firing can be most advantageously employed to meet the earlier stages of an infantry assault, or to resist, either in line or rally, a sudden attack of cavalry. It can be used earlier in the action in assisting the officer noticing the relative positions of the hostile forces and of the dust raised by

the simultaneous fall of many bullets, in determining the corrections that may be required in his estimate of that distance.

Its moral effect upon the enemy when at some distance also exceeds that produced by independent fire, and may therefore unduly hasten their deployment.

For the offensive, volley firing should be conducted by troops especially selected and posted on the flanks of the attacking force or upon some dominant position in the rear. It can then be employed to great advantage at long ranges and before the attacking force is fully engaged. Its use by the attacking force itself should also be maintained as long as possible, as it keeps the men well in hand, affords an interval when commands can be heard, and permits the officers to observe the effects of the fire and to make such changes as may be advisable in the disposition of the troops, and to reestablish calmness and steadiness among the men. At the latter stages of the assaults, the firing should be conducted continuously and as rapidly as possible, its effectiveness being principally due to the flatness of the trajectory rather than to any great accuracy of aim. After a position is carried by troops having orders not to advance beyond a certain point the employment of volleys against a retreating enemy is advantageous, and will quickly bring the attacking force under the complete control of its officers.

436. LONG-RANGE FIRE.—The distances at which fire should be opened depend greatly upon the supply of ammunition and the opportunities for replenishing it, the nature of the ground, and the size and tactical importance of the objective. Long-range fire should generally be employed by troops acting on the defensive, particularly if in a permanent position, when the supply of cartridges will be practically unlimited; it should, however, always be under the control of the officers, both as to the time for firing and the number of shots delivered. With its use several lines of fire, one posted above the other, can be directed upon the same portion of an attacking force. It will obviate the necessity of occupying many points which can be covered from the main line. It unduly hastens the deployment of an attacking force, compelling them to take up the formation for combat at a considerably greater distance, and thus makes it harder to correct any erroneous dispositions; besides the casualties occasioned, it impairs the morale, draws their fire at a time when it is not very effective,

thereby decreasing their supply of ammunition, and may greatly increase the difficulties attending their occupancy of some important position, though it can not prevent its final accomplishment.

Long-range fire on the part of the offensive should be conducted by specially selected troops; it will be often possible by this means to deceive the defender as to the real point of attack. It possesses great value in turning movements, since it will be possible to suddenly pour in a heavy enfilading fire from a considerable distance. It enables a powerful fire to be concentrated on any point of the defender's line, since troops from distant parts of the field can take part in it, and if the position attacked is on the crest of a dominating plateau, it will so sweep the ground in the rear as to increase the difficulties of bringing forward reinforcements. Its employment by the attacking column is not desirable; it unduly depletes their supply of ammunition and greatly retards the advance, often occasioning serious halts. It will be better not to open fire until within 1,400 yards of the position to be attacked; even then it will not be very efficacious, but it encourages the men, and is in fact very difficult to prevent. Against a retreating force long-range fire is particularly useful, and should be conducted up to its extreme limits.

437. FIRE DISCIPLINE.—Fire discipline, upon which to a great extent the effect of the fire at every stage of the action depends, can not be obtained by instruction in rifle firing alone, but requires a thorough drilling and instruction in the various duties of the soldier, a habit of prompt and unquestioning obedience, and an implicit confidence in the judgment of the officers. It is requisite that the officers charged with the control of the fire should be thoroughly self-possessed and able to decide promptly any questions that may arise; that they should be educated in the estimation of distances, be able to determine at a glance the comparative importance of different objectives, and also have a thorough knowledge of the ballistic properties of the weapon with which their men are armed, and of the effects which it may be expected to produce.

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